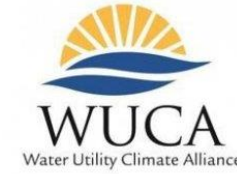
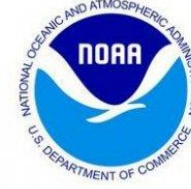


Showcasing Leading Practices in Climate Adaptation Webinar Series

*Experiences from the Water Sector
to Empower Other Sectors and Communities*



**We will be
starting shortly**



Showcasing Leading Practices in Climate Adaptation Webinar Series

Session 1: Leading Practices in Climate Adaptation



Welcome:

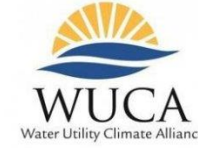
Nancy Beller-Simms, PhD

NOAA Climate Program Office
Adaptation Sciences Program

Housekeeping

- If you can hear me, you are already connected to the broadcast and do not need to call in.
- If you hear feedback and have connected via phone, please hang up and ensure your computer's audio is turned on.
- If you are having technical issues, contact us through the chat function.
- If you have a question, please write it in the Q&A section.
- After the broadcast, we will send a recording of the session and a certificate of participation. We will also post the recordings and presentations.

Planning Committee



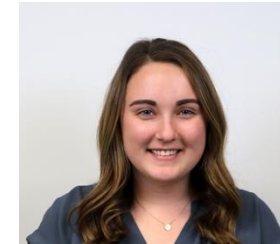
THE
Water
Research
FOUNDATION



National Oceanic and Atmospheric Administration,
Climate Program Office, Adaptation Sciences Program

Nancy Beller-Simms, PhD

Amanda Speciale



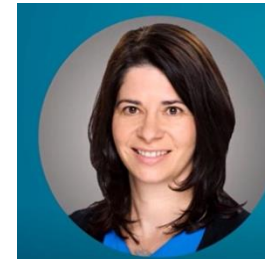
Water Utility Climate Alliance (WUCA)

Laurina Kaatz



Water Research Foundation (WRF)

Maureen Hodgins



U.S. Environmental Protection Agency

Steve Fries, PhD

Klara Zimmerman



Background on this Series

- We will explore practical lessons and leading practices in building for climate resilience.
- Water utilities will share experiences with peer sectors seeking to learn and taking steps to adapt now.
- The goal of these webinars is to help us, adaptation practitioners, advance our thinking about effective approaches by learning from and collaborating with our peers.



Future Webinars

Showcasing Leading Practices in Climate Adaptation Webinar Series

Session 2: Climate Adaptation Engineering Case Studies

November 18, 2021, 1-2:00 pm EST

Session 3: Business Function Mapping

December 2, 2021, 2-3:00 pm EST

Session 4: Equity and Environmental Justice Considerations in Climate Adaptation

December 9, 2021, 1-2:30 pm EST

Session 5: Green Stormwater Infrastructure

January 6, 2022, 1-2:30 pm EST

Session 6: Greenhouse Gas and Energy

January 20, 2022, 1-2:00 pm EST

Session 7: Climate Warming and Impacts to Staff and Assets

February 3, 2022, 1-2:00 pm EST

Session 8: Federal and Other Funding for Adaptation

February 17, 2022, 1-2:00 pm EST

Additional Resources

- U.S. Climate Resilience Toolkit
toolkit.climate.gov
→ Search “water resources dashboard” to access NOAA tool
- NOAA Climate Program Office
cpo.noaa.gov
→ Search “Adaptation” and/or “Water Resources”
- Water Utility Climate Alliance
wucaonline.org
- Water Research Foundation
waterrf.org
- U.S. EPA Creating Resilient Water Utilities
epa.gov/crwu



Julie Vano
Research Director,
Aspen Global Change
Institute



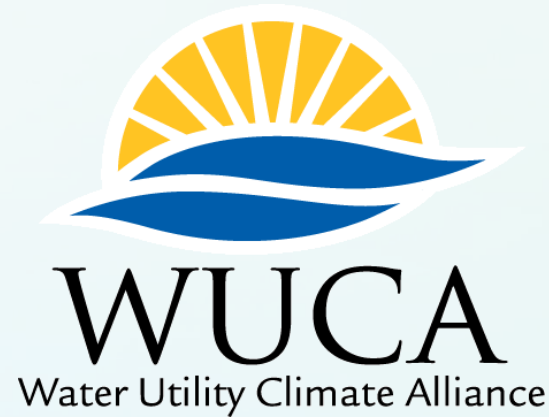
Kavita Heyn
Climate Resiliency
Planning Manager at
the Portland Water
Bureau;
Chair of the Water
Utility Climate Alliance



Lurna Kaatz
Director, Denver Water
Climate Science, Policy,
and Adaptation
Program

Leading Practices in Climate Change Adaptation

NOVEMBER 4, 2021
(VIRTUAL)



Laurina Kaatz, *Project Lead*, Denver Water, WUCA Past Chair

Kavita Heyn, *Portland Water Bureau, WUCA Chair*

Julie Vano, *Research Lead*, Aspen Global Change Institute

Heather Dalrymple and Marisa Flores-Gonzalez, Austin Water

Mohammed Mahmoud, Central Arizona Project

Jennifer McCarthy, Metropolitan Water District of Southern California

Alan Cohn, New York City Dept of Env. Protection, WUCA Vice Chair

Abby Sullivan and Julia Rockwell, Philadelphia Water Department

Seevani Bista and Goldamer Herbon, San Diego County Water Authority

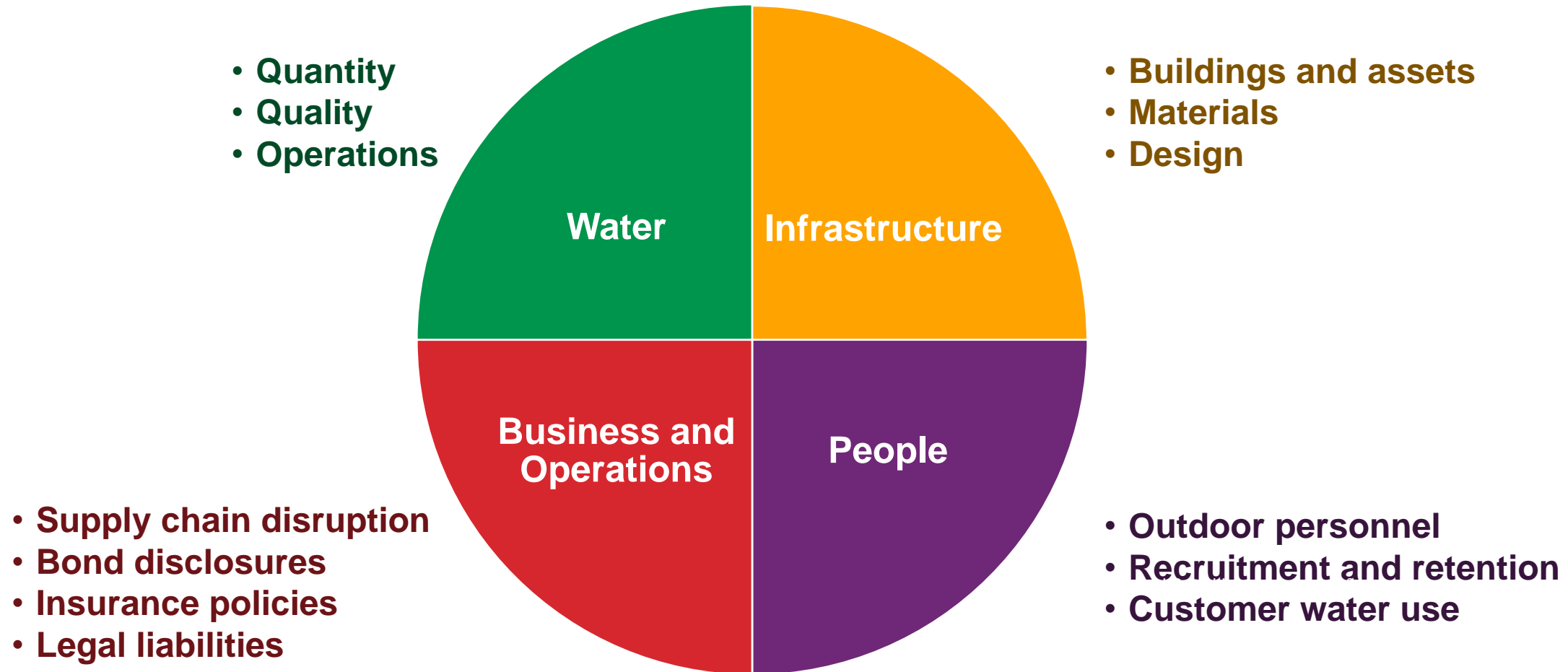
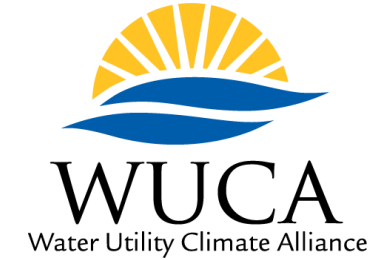
David Behar, San Francisco Public Utilities Commission

Danielle Purnell and Ann Grodnik-Nagle, Seattle Public Utilities

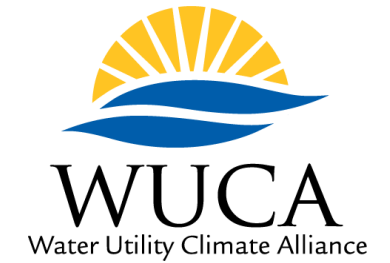
Keely Brooks, Southern Nevada Water Authority

Tirusew Asefa, Tampa Bay Water

Climate Change Impacts *All* Organizational Functions



Water Utility Climate Alliance



Mission

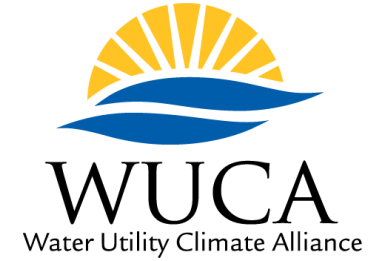
Collaboratively
advancing water
utility climate change
adaptation

Vision

Climate-resilient
water utilities
supporting thriving
communities



Developing New Concepts



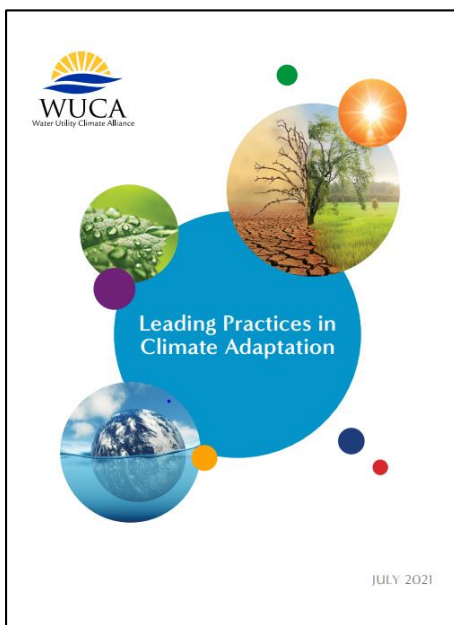
Mainstreaming is proactively streamlining and embedding climate information and adaptation into practices, plans, and decisions.

Adaptive Capacity is a “built-in” ability to rapidly adjust, take advantage of new opportunities, or cope with change

WUCA Mainstreaming Projects & Forthcoming Webinars



Leading Practices



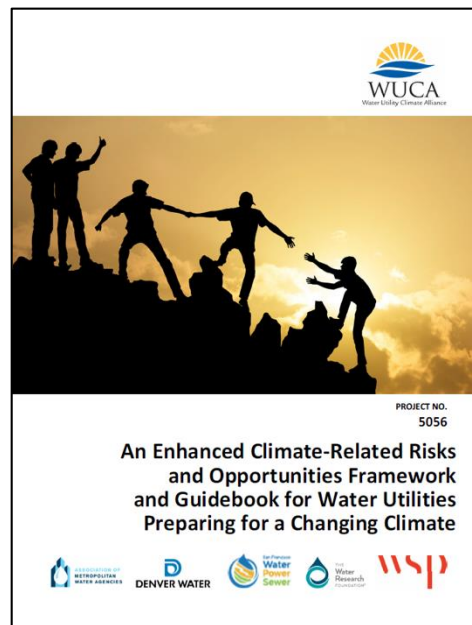
Today!

Engineering Case Studies



November 18

Business Function Mapping



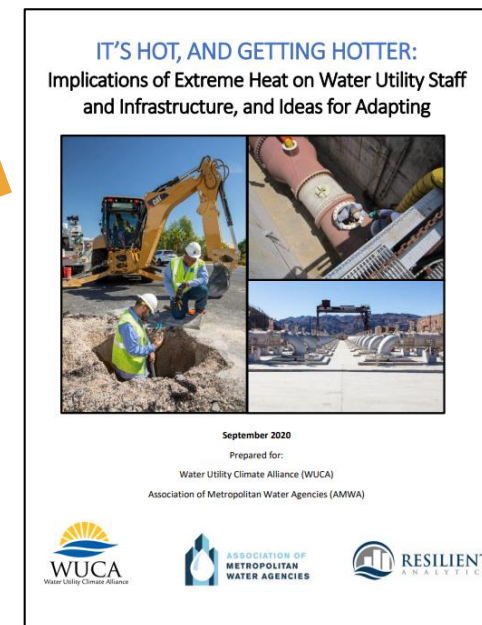
December 2

Greenhouse Gas Mitigation



January 20

Extreme Heat Impacts Case Studies

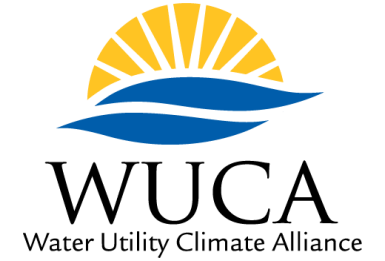


February 3



Learning How to Adapt to a Changing Climate Together

Leading Practices in Climate Adaptation



Goal: gather and share WUCA's experiences to help develop and implement climate change adaptation more effectively.

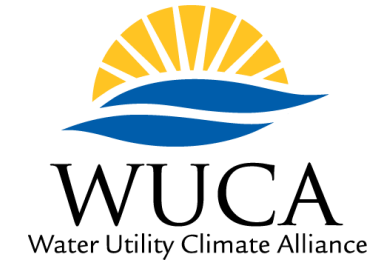


Path: develop a set of versatile Leading Practices, grounded in WUCA experiences, that spur innovations within and across utilities and with the adaptation community more broadly.

CLIMATE ADAPTATION ACTION AREAS



Composition of a Leading Practice



Foster sustained relationships with the climate science community

Climate science continues to advance, providing new data, tools, and knowledge. Long-term relationships with those who study climate science and provide climate services can help you navigate what is new and relevant and help scientists focus on questions that matter to society. The relationship, how it is established and maintained, can vary, thus opportunities exist that span a range of needs and resources.

Example: Adding a partnering objective into one's business plan

San Diego County Water Authority's (SDCWA) 2017-2021 Business Plan contains a sustainability program that includes climate change management strategies focused on maintaining a leadership role in collaboratively advancing climate science research. A key objective of the climate change strategy is to partner with those doing leading-edge climate science to develop strategies in adaptation, sustainability, and resiliency. This has resulted in SDCWA partnering with the Scripps Institution of Oceanography's research arm, the Center for Western Weather and Water Extremes (CW3E).

SDCWA is a founding member of CW3E, which is focused on advancing understanding of atmospheric rivers and droughts to improve water management, mitigate flood risk, and increase water supply reliability. SDCWA has also collaborated with consultants and the Bureau of Reclamation to develop climate change-impacted demand and supply scenarios, as well as do evaluations of climate change impacts on surface water runoff (see [UNDERSTAND: Invest in understanding climate science](#) for more details).

Examples: Piloting Utility Modeling Applications (PUMA)

WUCA PUMA projects aimed to foster relationships, and many of the connections made remain strong today. As described in the final report on PUMA, "The PUMA project was an effort to produce actionable science through close collaboration between climate experts and utility personnel to meet the needs of four water utilities.

Instead of asking climate experts what they thought utilities should do regarding climate change, four WUCA utilities agreed to forge partnerships with scientific institutions to explore how to integrate climate considerations into their specific management context." [Read the PUMA report.](#) PDF

Additional climate service resources

If you do not have adaptation staff or funding to work with researchers, these resources can help support your effort:

- Your [local NOAA RISA Group](#)
- Your [regional USGS Climate Adaptation Science Center](#)
- Your [USDA Climate Hub](#)

These types of "boundary organizations" exist to help connect researchers and practitioners at the regional level.

Several non-federal organizations that also focus on serving communities:

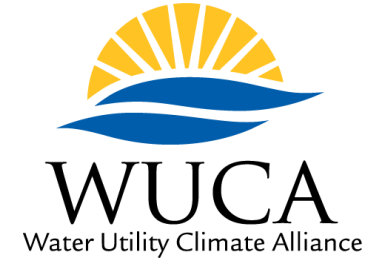
- [Thriving Earth Exchange](#)
- [Mountain West Climate Services Partnership](#)

There are also tools, reports, and trainings that provide free technical climate science information, including (but not limited to):

- [US Climate Resilience Toolkit](#)
- [US Climate Explorer](#)
- [National Climate Assessment](#)
- [National Center for Atmospheric Research resources](#)

- Leading Practice headline at the top. Circle indicates action area
- 1-3 sentence description of leading practice, common across utilities
- Examples: from individual utilities, 1-2 paragraph explanation and links to additional information
- Additional Resources: related leading practices, links to similar efforts, educational materials

ENGAGE



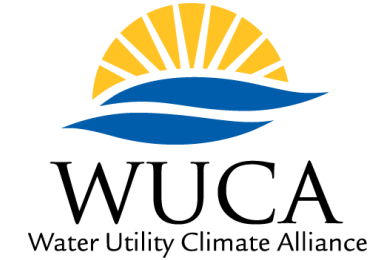
Seek out and support climate champions throughout your organization

Progress happens more quickly with support by motivated individuals who value and prioritize climate adaptation work. It is important to build relationships and educate champions.



In 2019, Austin Water established a new staff position, Climate Protection Consultant, to place additional utility-wide focus on climate issues. This person enhances information sharing, works to incorporate climate concerns into cross-functional utility planning efforts, and represents Austin Water on city-wide climate planning initiatives.

ENGAGE



Seek out and support climate champions throughout your organization

Progress happens more quickly with support by motivated individuals who value and prioritize climate adaptation work. It is important to build relationships and educate champions.



City of Austin - JOB DESCRIPTION



Climate Protection Consultant

FLSA:	Standard/Exempt	EEO Category:	(20) Professionals
Class Code:	10124	Salary Grade:	IE8
Approved:		Last Revised:	August 28, 2019

Purpose:

Under general direction, this position researches, develops, and implements departmental climate protection programs and provides oversight of departmental climate protection policies, operational directives, and procedures.

Duties, Functions and Responsibilities:

Essential duties and functions, pursuant to the Americans with Disabilities Act, may include the following. Other related duties may be assigned.

1. Provides leadership for departmental climate programs across divisions and works in coordination with other departments to develop, implement, and evaluate plans or procedures that promote climate protection awareness and initiatives.
2. Analyzes climate-related research findings to identify departmental threats and challenges from climate change and proactively develops ways to



Include equity from the beginning

Effective solutions to climate change challenges depend on many factors, all of which might not be clear at the onset. Engaging and focusing on the needs of communities, particularly those most vulnerable to disruptions caused by climate impacts, is best done at the beginning and throughout a project. By improving conditions for the most vulnerable in your community, you also improve conditions for everyone.

Example: Centering community priorities

Sea level rise, urban flooding, and increasingly severe heat island effects disproportionately impact lower income neighborhoods. In Seattle, one neighborhood in particular is comprised of Seattle's lowest-lying lands and faces severe health and environmental injustices, plus increasing pressure of gentrification. **Seattle Public Utilities** (SPU) is leveraging substantial drainage and wastewater investments in this neighborhood to spur neighborhood capacity building, SLR adaptation planning and multi-benefit projects.

This work is resulting in a Resilience District, framing SLR adaptation as an anti-displacement strategy, driving economic opportunity and affordable housing in concert with water quality and flood mitigation measures. The Resilience District will build on city policies and programs and will also establish a community-led entity so that the community can meaningfully participate in and benefit from public projects. Building strong partnerships with community and philanthropy that can come together to build momentum around each other's investments is essential. So, too, is the community's capacity to order and effectively voice their priorities, since basic needs (affordable housing, anti-displacement measures) may need to be met before they can effectively turn to investing in longer-term climate related adaptation.

SPU is also centering community priorities in its integrated system plan, [Shape Our Water](#), by striving to create a shared vision with Seattle communities and stakeholders. This process will guide SPU's investments in resilient drainage and wastewater systems for the next 50 years. The plan is driven by environmental stewardship, environmental justice, regulatory compliance, affordability, equity, science and data, collaboration and empowerment. The [community engagement process](#) is using innovative practices such as public art, fireside chats, and community partners and stories, hear from those who have not previously had a fair opportunity to shape drainage and wastewater decisions.

Example: Strategic planning

The **Portland Water Bureau** (PWB) embedded equity in every part of its recent five-year strategic planning process, with the goal of creating a plan that reduces systemic inequality and its impacts on employees and the people PWB serves. The utility collected equity-specific risks, scored risk consequences based on equity, identified strategies that would lead to equitable outcomes, and redefined its commitment to equity.

After a couple climate change strategies in the plan were identified as having a larger equity impact, an equity working group within the utility reviewed them and recommended equity-specific actions, which are also documented in the utility's Plan to Advance Equity, Diversity, and Inclusion. For example, because low-income and marginalized communities of color are often most vulnerable to the impacts of climate change, reducing carbon emissions is an important strategy that contributes to racial equity and the PWB's role in mitigating climate change has important equity implications. PWB also has an Equity Manager that leads equity work within the agency and an Equity Committee that advised throughout the strategic plan development process.

- [Portland Water Bureau Strategic Plan](#)

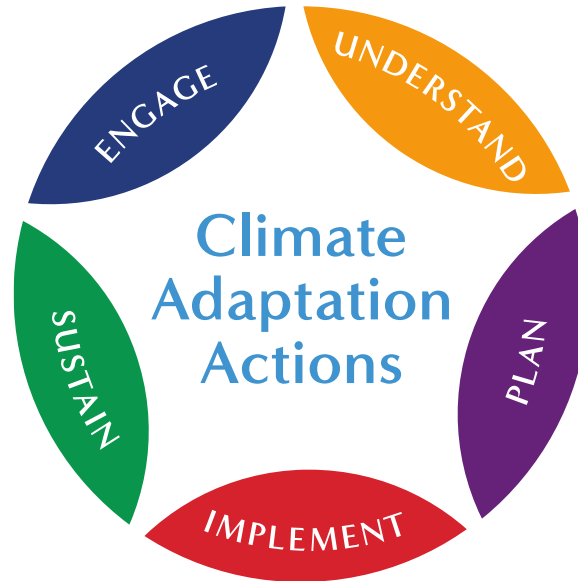
See more:
wucaonline.org

Additional resources

Become familiar and stay centered around the [US Water Alliance's Pillars of Water Equity framework](#) and what the framework means for your utility's planning and operations.

The [Center for Community Investment](#) provides useful resources. While they are not utility-specific, the paper "Community Investments: Focusing on the System" is particularly relevant to utilities.

Fill in your activities and track your progress.





ENGAGE

- [Recognize many ways to motivate climate adaptation action](#)
- [Seek out and support climate champions throughout your utility](#)
- [Consult expertise throughout your utility regularly and with purpose](#)
- [Tailor the climate adaptation message for the intended audience](#)
- [Develop a climate communications plan](#)
- [Include equity from the beginning](#)
- [Make the business case for climate adaptation](#)

UNDERSTAND

- [Invest in understanding climate science](#)
- [Explore how extremes might change in the future](#)
- [Value simple vulnerability assessments](#)
- [Foster sustained relationships with the climate science community](#)
- [Know your water system](#)
- [Think broadly about climate impacts](#)
- [Be a savvy consumer: recognize values and limits of climate science in practice](#)
- [Know your past climate conditions](#)
- [Recognize the value of long-term monitoring](#)

PLAN

- [Connect with ongoing or upcoming planning processes](#)
- [Leverage the power of well-placed climate change screening questions](#)
- [Be prepared to be changed by the process](#)
- [Learn from earlier climate change planning efforts](#)
- [Develop tools that allow information customization](#)

- [Take on climate change as another component of risk management](#)
- [Leverage existing funding mechanisms](#)
- [Plan for a range of futures, not a single future](#)
- [Employ decision-making science and deep uncertainty concepts](#)
- [Build and maintain in-house capacity](#)

IMPLEMENT

- [Be prepared to act when opportunities arise](#)
- [Find co-benefits and no- and low-regret adaptation strategies](#)
- [Recognize some adaptations can be employed quickly](#)
- [Recognize smaller changes can lead to bigger ones](#)
- [Focus on your organization's core responsibilities first](#)
- [Enact incentives or policies that change behavior](#)
- [Enact changes in infrastructure and operations](#)

SUSTAIN

- [Make the business case for climate adaptation](#)
- [Leverage existing funding mechanisms](#)
- [Monitor and evaluate current conditions](#)
- [Approach climate adaptation through mainstreaming](#)
- [Avoid new climate science whiplash](#)
- [Keep moving forward, even if it feels slow](#)
- [Value climate adaptation as more than a plan](#)
- [Establish a community of practice to integrate climate change adaptation](#)
- [Build and maintain in-house capacity](#)
- [Seek out and support climate champions throughout your utility](#)

Questions to ponder

- What leading practices has your organization implemented?
- What climate adaptation practice has your organization tried that you would recommend to others?
- What leading practices would you like your organization to implement in 2021 or 2022?



ENGAGE

Motivating action, engaging stakeholders, supporting others, and developing climate messages

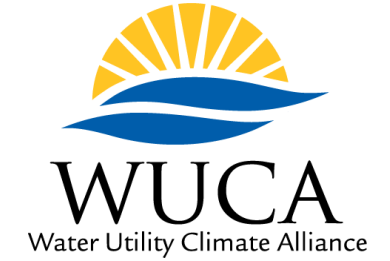


ENGAGE

- Recognize many ways to motivate climate adaptation action
- Seek out and support climate champions throughout your utility
- Consult expertise throughout your utility regularly and with purpose
- **Tailor the climate adaptation message for the intended audience**
- Develop a climate communications plan
- **Include equity from the beginning**
- Make the business case for climate adaptation



ENGAGE



Include equity from the beginning

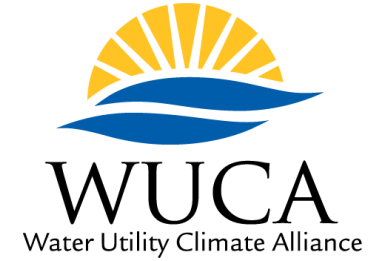
Engaging and focusing on the needs of communities, particularly those most vulnerable to disruptions caused by climate impacts, is best done at the beginning and throughout a project. This benefits everyone.



Embedded equity in recent 5-year Strategic Plan, including climate change actions to mitigate extreme heat and wildfire smoke impacts to crews working in the field. BIPOC employees may be more vulnerable due to historical health economic and social disparities.

Plan to Advance Equity, Diversity and Inclusion identifies climate mitigation and adaptation actions.

ENGAGE



Tailor the climate adaptation message for the intended audience

A climate adaptation message that resonates with one individual or group might not with others.



The Climate Change Adaptation Program at PWD developed messages specific to different audiences within their utility. For example, they shared with engineers how climate non-stationarity might challenge standard engineering practices, procedures, and tools.

ENGAGE

Tailor the climate adaptation message for the intended audience

A climate adaptation message that resonates with one individual or group might not with others.

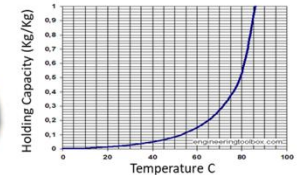


Messages that resonate with engineers

Principles that govern the water cycle affected by climate change

Principle #1

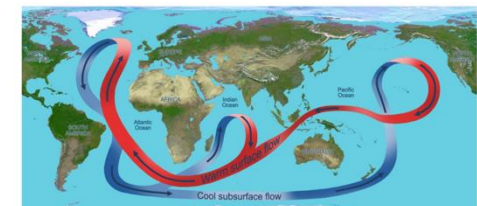
Warm air holds more moisture than cold air. "Atmospheric holding capacity"



Principle #2

Warm air increases evaporation and transpiration rates

Principle #3
Temperature changes influence global circulation patterns (atmosphere & ocean)





UNDERSTAND

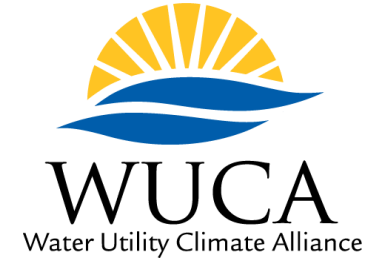
Understanding climate science, your system, and your system's vulnerabilities, risks and opportunities

UNDERSTAND

- Invest in understanding climate science
- Explore how extremes might change in the future
- Value simple vulnerability assessments
- **Foster sustained relationships with the climate science community**
- **Know your water system**
- Think broadly about climate impacts
- Be a savvy consumer: recognize values and limits of climate science in practice
- Know your past climate conditions
- Recognize the value of long-term monitoring



UNDERSTAND



Foster sustained relationships with the climate science community

Climate science continues to advance providing new data, tools, and knowledge. Long-term relationships can help navigate what is new and relevant, and what climate questions are important.



A student program that allows continuous connections with the university community and supports the growth of a workforce savvy in both utility needs and applied climate change science.

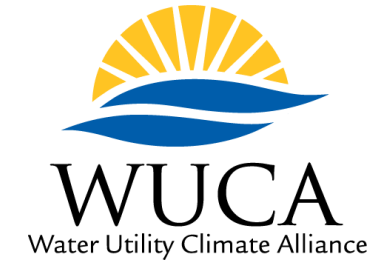


Tirusew Asefa and students David Gold and David Gorelick

UNDERSTAND

Know your water system

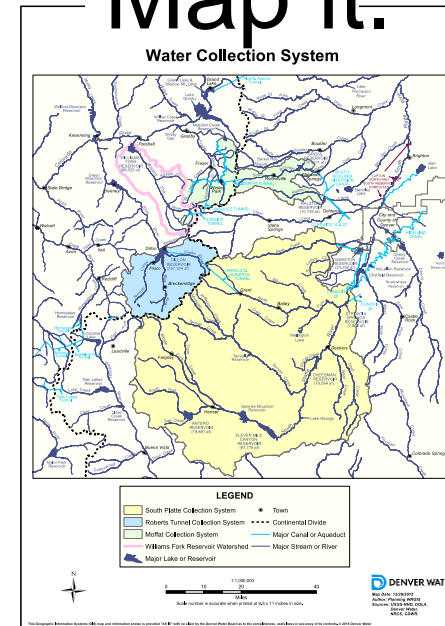
To understand climate change impacts, it is important to know your water system (e.g., where water comes from, how is it stored, what are key operations) and explore its susceptibilities.



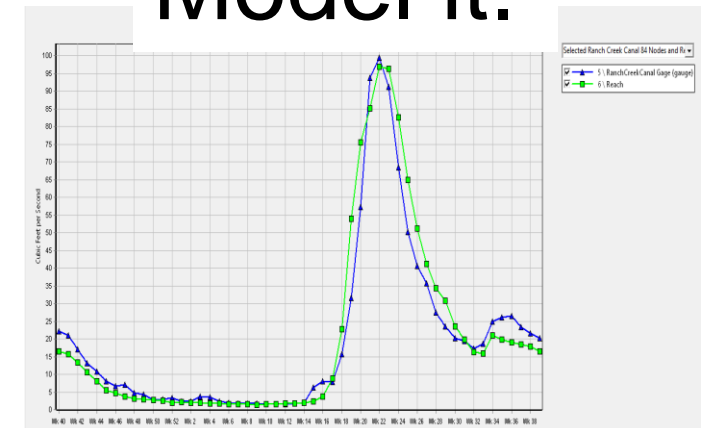
See it.



Map it.



Model it.



>80% precipitation goes to atmosphere, warming has overall drying effect

Learn.

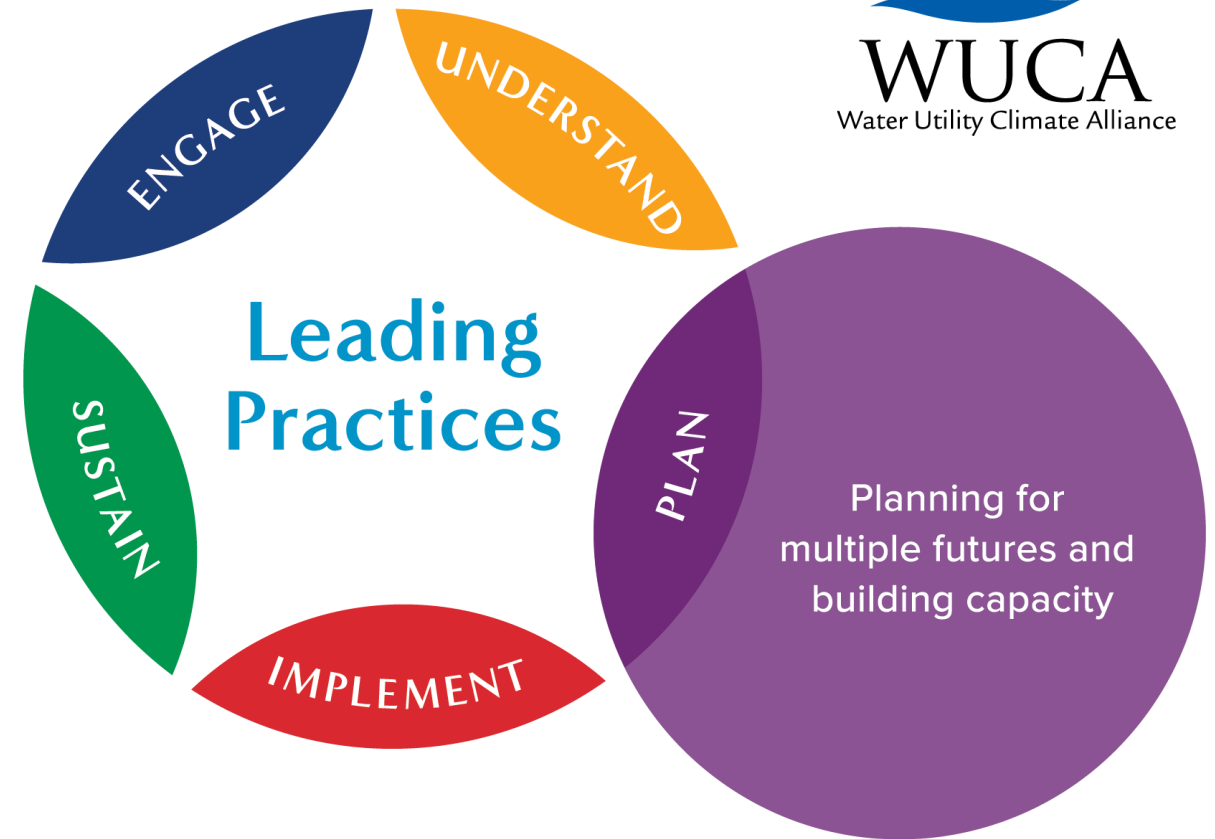
PLAN

Building capacity
and planning for
multiple futures

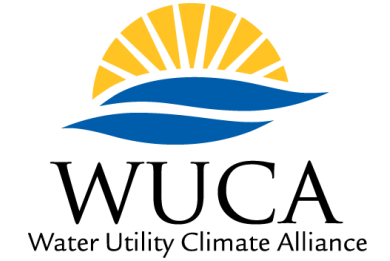


PLAN

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- Leverage existing funding mechanisms
- Plan for a range of futures, not a single future
- Employ decision-making science and deep uncertainty concepts
- Build and maintain in-house capacity



PLAN



Leverage the power of well-placed climate change screening question

Climate adaptation happens when there is increased awareness that future conditions will be different. While it is not clear how big changes will be, a lot can be accomplished just by asking managers to evaluate new vulnerabilities to understand the implications of an uncertain future.



CAPITAL PLANNING PROGRAM

Guidance for Incorporating Sea Level Rise into Capital Planning in San Francisco Sea Level Rise Checklist (Version 2.0)

SECTION 4 – Capital Planning Committee

This section is for City Engineer and Capital Planning Committee or Designee completion only.

This project is certified as consistent with the CCSF Sea Level Rise Guidance and

- ☐ will not be exposed to expected SLR and related flooding impacts during its functional lifespan
- ☐ is exposed but is not vulnerable due to low sensitivity or high adaptive capacity
- ☐ is exposed, is vulnerable, but includes sufficient adaptation planning for SLR
- ☐ will require additional adaptation planning

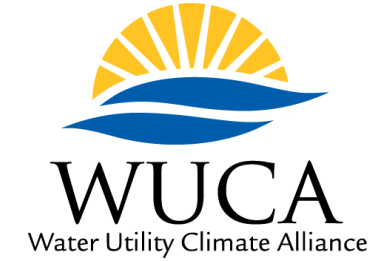
PLAN

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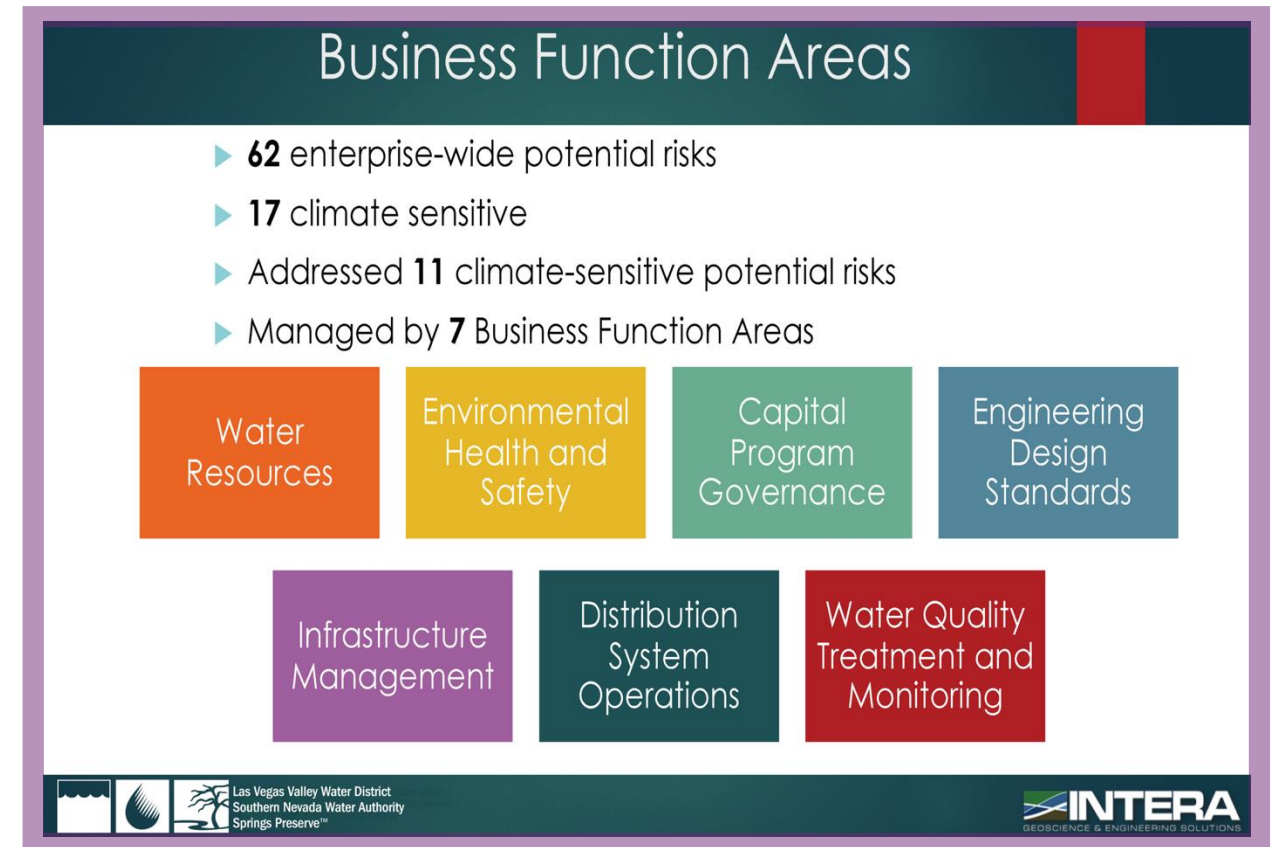
PLAN



Take on climate change as another component of risk management

While climate change adds new elements, utilities already have many tools for managing uncertainty and risks that can be leveraged.

Southern Nevada Water Authority conducted an enterprise-wide risk assessment. **What are your existing risks? How might they change with climate change (e.g., increasing frequency of failure)?**



IMPLEMENT

Acting to implement changes
in assets and actions

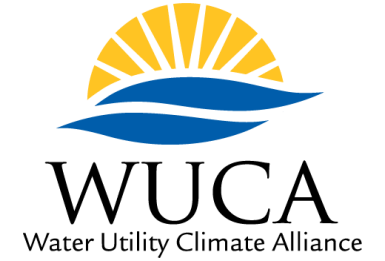


IMPLEMENT

- Be prepared to act when opportunities arise
- **Find co-benefits and no- and low-regret adaptation strategies**
- Recognize some adaptations can be employed quickly
- Recognize smaller changes can lead to bigger ones
- Focus on your organization's core responsibilities first
- Enact incentives or policies that change behavior
- **Enact changes in infrastructure and operations**



IMPLEMENT



Find co-benefits and no- and low-regret adaptation strategies

Preparing for climate change often requires selecting the “least-bad” options, but not always. When possible, find actions that have no or low regrets or even result in positive impacts. Win-wins build overall resilience.



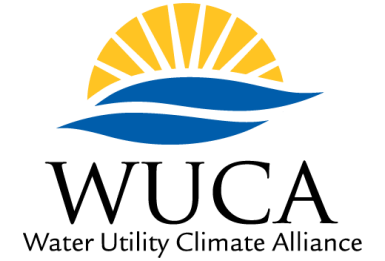
Using the designs and the interagency partnerships established under its Green Infrastructure Program, New York City is developing new approaches to managing higher intensity rainfall events, or "cloudbursts," which are expected to increase with climate change. These projects also help mitigate urban heat island effects.

IMPLEMENT

Enact changes in facilities plans, designs, and operations

Strategies to enact change range widely: from diversifying water supply sources to expanding local surface water reservoir storage to modifying pumping station designs.

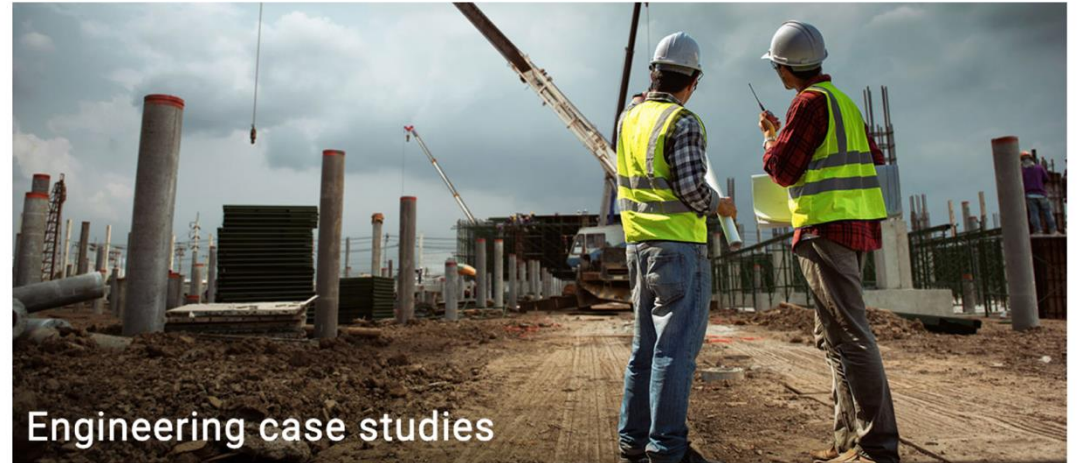
A WUCA effort to identify facility and infrastructure-based adaptation strategies that incorporate climate information.



Engineering Case Studies supporting peer-to-peer learning



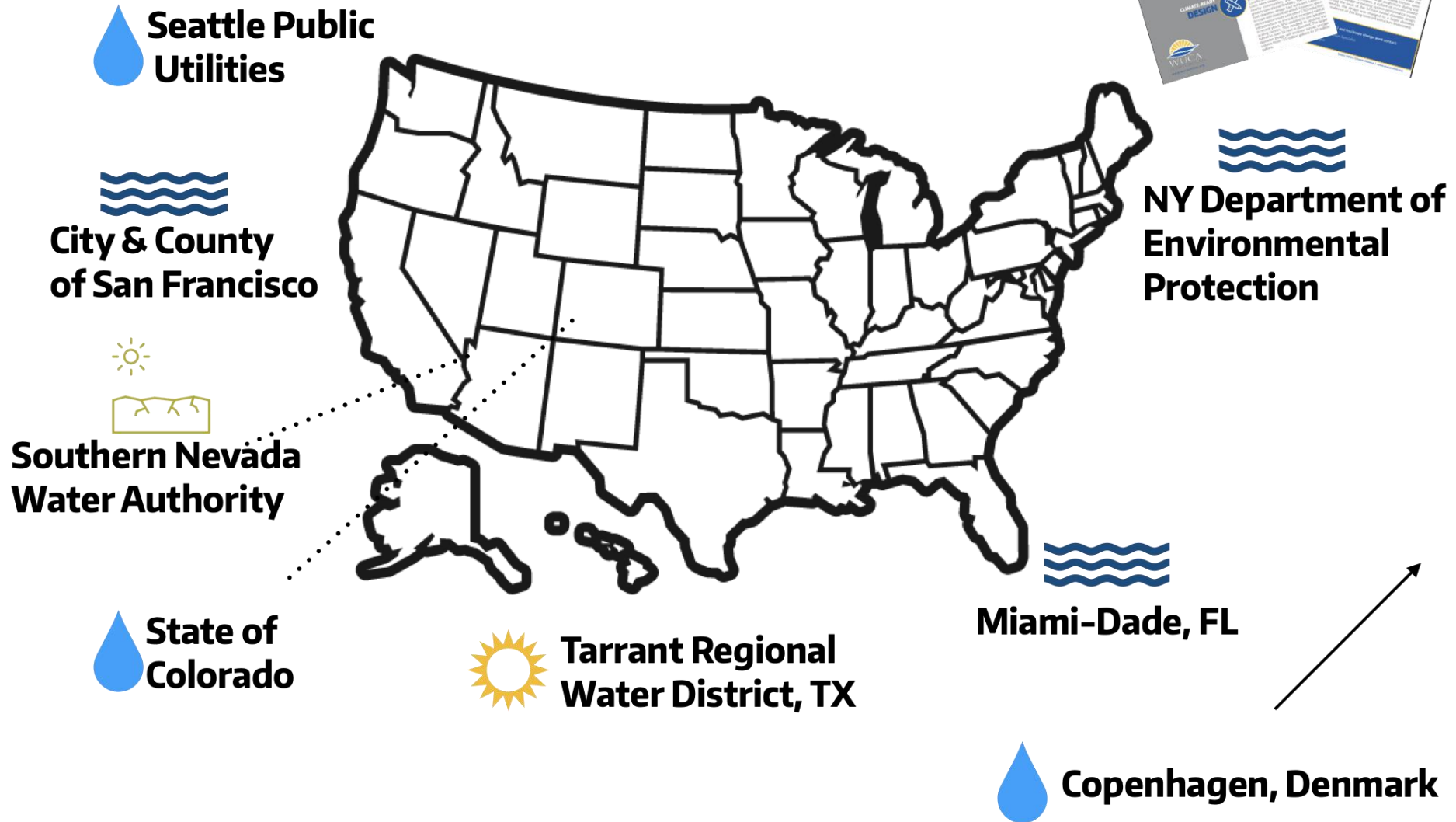
Water Utility Climate Alliance



Engineering case studies

<https://www.wucaonline.org/adaptation-in-practice/engineering-case-studies/>

- Engineering Case Studies -





SUSTAIN

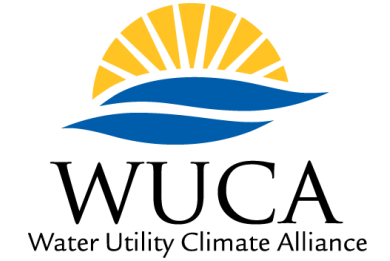
Monitoring conditions,
developing funding,
maintaining capacity,
and managing expectations

SUSTAIN

- Make the business case for climate adaptation
- Leverage existing funding mechanisms
- Monitor and evaluate current conditions
- **Approach climate change adaptation through mainstreaming**
- Avoid new climate science whiplash
- Keep moving forward, even if it feels slow
- Value climate adaptation as more than a plan
- **Establish a community of practice to integrate climate change adaptation**
- Build and maintain in-house capacity
- Seek out and support climate champions throughout your utility



SUSTAIN



Establish a community of practice to integrate climate change

A community can provide a supportive forum for instigating ideas, defining focus, sharing knowledge, and communally advancing and celebrating progress.



For greater clarity and cohesion in its climate work, SPU established a community of practice that meets quarterly to share broadly about climate-related information, impacts, initiatives, concerns, and innovations.



SUSTAIN



Approach climate adaptation through mainstreaming

Mainstreaming allows utility subject matter experts to work with their climate leads or champions to co-produce relevant and timely adaptation solutions, and create utility-wide resilience.



Denver Water engaged in tabletop exercises with subject matter experts:

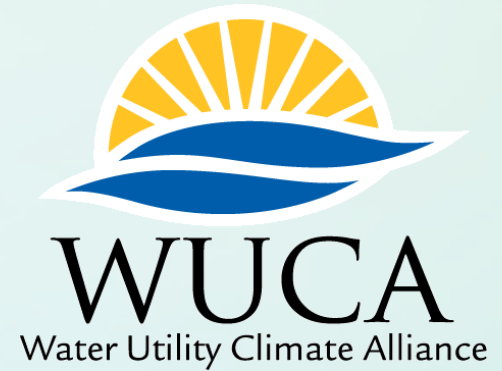
1. reflected on how climate change has already impacted their work
2. considered how two different future climate change scenarios could impact each business function
3. identified adaptation solutions to mitigate risks and capitalize on opportunities.

Valuable Lessons

- Champions are integral!
- Mainstreaming is critical, but can be challenging
- Adaptation is iterative
- Science will never be perfect – get going now!
- Perfect can be the enemy of the good
- Process often more important than resulting plan



Leading Practices in Climate Adaptation



Released in July 2021, and intended to be living, learning, leading practices

Ideas, comments, questions?

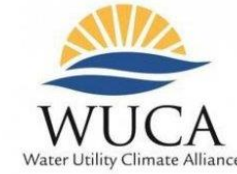
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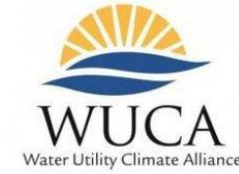
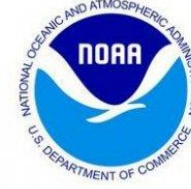


Showcasing Leading Practices in Climate Adaptation Webinar Series

*Experiences from the Water Sector
to Empower Other Sectors and Communities*

Questions?

Type them in the Question & Answer box!



Thank you!

Please make sure to fill out the form in the chat and register for the upcoming sessions.